
कठोर धातुओं के लिए टंगस्टन पाउडर —
विशिष्टि
(दूसरा पुनरीक्षण)

Tungsten Powder for Hardmetals —
Specification
(Second Revision)

ICS 77.160

© BIS 2023



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Powder Metallurgical Material and Product Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1977 and subsequently published in 1985. This revision has been brought out to bring the standard in latest style and format of the Indian Standards. It also incorporates 1 amendment issued to the last version of the standard.

This standard contains **5.1.1** and **8** which call for agreement between the purchaser and the manufacturer.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

*Indian Standard***TUNGSTEN POWDER FOR HARDMETALS — SPECIFICATION***(Second Revision)***1 SCOPE**

This standard covers the requirements of tungsten powder used for manufacturing of hardmetals.

2 REFERENCE

The standards given below contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards:

<i>IS No.</i>	<i>Title</i>
IS 1387 : 1993	General requirements for the supply of metallurgical materials (<i>second revision</i>)
IS 5644 (Part 2) : 2005/ISO 4491-2 : 1997	Metallic powders — Determination of oxygen content by reduction methods: Part 2 Loss of mass on hydrogen reduction (hydrogen loss) (<i>fourth revision</i>)
IS 6492 : 2020/ISO 3954 : 2007	Powders for powder metallurgical purposes — Sampling (<i>first revision</i>)
IS 7512 : 2006	Method for the determination of average particle size of metal powders by fisher sub-sieve sizer (<i>first revision</i>)

3 SUPPLY OF MATERIALS

General requirements relating to supply of tungsten powder to this specification shall be as laid down in IS 1387.

4 MANUFACTURE

Tungsten powder shall be manufactured by hydrogen reduction process.

5 CHEMICAL COMPOSITION

5.1 The chemical composition of the powder shall be

as given below:

<i>Sl No.</i>	<i>Element</i>	<i>Weight Percent</i>
(1)	(2)	(3)
i)	Al	0.003
ii)	Ca	0.005
iii)	C	0.01
iv)	Cr	0.01
v)	Co	0.05
vi)	Cu	0.01
vii)	Fe	0.05
viii)	Mo	0.10
ix)	Ni	0.01
x)	O ₂	0.20
xi)	Si	0.005
xii)	Na + K	0.002
xiii)	S	0.002
xiv)	P	0.01
xv)	Hydrogen loss	0.30
xvi)	W	Balance

NOTE — The composition limits indicated are expressed as a weight percentage maximum, unless otherwise specified.

5.1.1 The method of chemical analysis shall be as agreed to between the purchaser and the manufacturer.

5.1.2 The hydrogen loss shall be determined in accordance with IS 5644 (Part 2).

6 AVERAGE PARTICLE SIZE

The average particle size shall be within 0.5 µm to 20 µm and shall be determined in accordance with IS 7512.

7 SAMPLING

The sampling of powders for conducting all the tests shall be done in accordance with IS 6492.

8 PACKING

The powder shall be supplied packed in suitable containers in quantities mutually agreed to between the purchaser and the manufacturer.

9 MARKING

9.1 Each container of tungsten powder shall be marked with the following information:

- a) Hydrogen reduced tungsten powder;
- b) Manufacturer's name;
- c) Batch number and the date of manufacture of powder; and
- d) Net mass of powder.

9.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

ANNEX A*(Foreword)***COMMITTEE COMPOSITION**

Powder Metallurgical Materials and Products Sectional Committee, MTD 25

<i>Organization</i>	<i>Representative(s)</i>
Indian Institute of Technology Kanpur, Kanpur	DR ANISH UPADHYAY (<i>Chairperson</i>)
Bhabha Atomic Research Centre, Mumbai	PROF AMIT SINHA
Bharat Heavy Electrical Limited, New Delhi	SHRI VIVEK ARYA SHRI BHARAT KUMAR PANT (<i>Alternate</i>)
Controllerate of Quality Assurance, Ichapur	SHRI A. MITRA SHRI T. K. PRUSTY (<i>Alternate</i>)
CSIR – Institute of Minerals & Materials Technology, Bhubaneswar	DR MAYADHAR DEBATA DR PRADYUT SENGUPTA (<i>Alternate</i>)
CSIR – National Metallurgical Laboratory, Jamshedpur	DR V. C. SRIVASTAVA
Defence Institute of Quality Assurance, Bangalore	DR N. KRISHNA MURTHY
Defence Metallurgical Research Laboratory, Ministry of Defence, Hyderabad	DR G. APPA RAO SHRI N. PRABHU (<i>Alternate</i>)
Electronica Tungsten Limited, Malegaon	SHRI A. N. CHASKAR SHRI BHALCHANDRA V. PATHAK (<i>Alternate</i>)
Innomet Advanced Materials Private Limited, Hyderabad	SHRI VINAY CHILAKAPATI
Kennametal India Limited, Bengaluru	SHRI ALOK BHASKAR SHRI K. CHANDRASHEKAR SHENOY (<i>Alternate I</i>) SHRI SHASHIKUMAR S. (<i>Alternate II</i>)
Ministry of Defence, New Delhi	SHRI A. K. MUKHERJEE
Mishra Dhatu Nigam Limited, Hyderabad	SHRIMATI U. SAVITHA SHRI BADRI VISHAL PANDEY (<i>Alternate</i>)
Nuclear Fuel Complex, Hyderabad	SHRI JOBIN KOSHY SHRI NIRMOL SANTRA (<i>Alternate</i>)
Society of Indian Automobile Manufacturers (SIAM), Delhi	SHRI P. K. BANERJEE SHRI AMIT KUMAR (<i>Alternate</i>)
The Metal Powder Company Limited, Madhurai	SHRI P. SUNDARAPANDIAN
BIS Directorate General	SHRI SANJIV MAINI, SCIENTIST ‘F’/SENIOR DIRECTOR AND HEAD (METALLURGICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary

SHRI G. RAM SAI KUMAR
SCIENTIST ‘B’/ASSISTANT DIRECTOR
(METALLURGICAL ENGINEERING), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website- www.bis.gov.in or www.standardsbis.in

This Indian Standard has been developed from Doc No.: MTD 25 (21708).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

	Telephones
Central : 601/A, Konnectus Tower -1, 6 th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	{ 2323 7617
Eastern : 8 th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	{ 2367 0012 2320 9474
Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	{ 265 9930
Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	{ 2254 1442 2254 1216
Western : Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	{ 2821 8093

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.